
Space Weather Forecast

Issued on Thursday, 02 May 2024 at 00:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period. Slight chance of a Minor geomagnetic storm days 3 and 4.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Moderate levels, with the biggest Moderate class flare from a region which is approaching the west limb. This region remains the largest and most complex on the visible disc, although as the region is now approaching the west limb analysis is becoming harder. All remaining regions are smaller, despite two of them increasing in size and complexity, especially the region which produced the other Moderate class flare of the period.

A filament (arc of the Sun's plasma) eruption beginning at 01/0600 UTC close to the large sunspot in the southwest disc resulted in a notable Coronal Mass Ejection (CME) signature in coronagraph imagery. Further analysis has revealed a possible Earth-directed component late on day 3 (4th), but more likely early on day 4 (5th). A region in the northeast emitted two narrow CME's, for which analysis is ongoing for, but currently the CME's are not expected to be Earth directed.

Solar Wind / Geomagnetic Activity: Solar winds were briefly at slightly elevated levels, reaching 431 km/s at 01/0025 UTC, then quickly decreased to background as initial weak CME influence eased. The strength of the solar wind's magnetic field remained Moderate, while the important north-south component was weakly negative at first before rotating to a moderately positive direction from around 01/0130 UTC. Thereafter the Bz remained positive, at moderate levels for much of the time but late in the period declining to become weak. Phi angle was generally negative at first, but then from late morning rotated to become positive. Resultant Geomagnetic activity was initially Active but then quickly declined to become Quiet.

Energetic Particles / Solar Radiation: Solar radiation was at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is likely to continue with further Moderate flares, and a slight chance of Strong flares, principally from the large and complex group in the southwest disc until it rotates behind the west limb. The developing region in the northeast, and returning regions likely to rotate onto the disc later in the period, are also potential sources of further Moderate flares.

Solar Wind / Geomagnetic Activity: There is a risk of a glancing blow from a CME that left the Sun on the 29th, arriving sometime during tomorrow (3rd May). A notable CME that left the disc around 01/0600 UTC from the southwest disc is now expected to give a glancing blow either late on day 3 (4th) or more likely early on day 4 (5th).

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Solar winds are currently at background levels (around 360km/s). A potential slight enhancement in the wind speeds may occur today (2nd May). Conditions are then expected to gradually return towards background tomorrow (3rd May). Then a further enhancement in the solar wind is likely tomorrow, with wind speeds reaching elevated levels later tomorrow, then persisting through days 3 and 4 (4th and 5th May). In addition, a glancing blow from the 1st May CME is possible from late day 3, but more likely into early day 4.

Geomagnetic activity is expected to be generally Quiet to Unsettled at first, but with a chance of Active intervals at times due to the potential HSS and CME arrival today. From late day 3 (4th) into day 4 (5th) activity is expected to increase to become Unsettled to Active, with a chance of Minor geomagnetic storm intervals.

Energetic Particles / Solar Radiation: Solar radiation is most likely to remain at background levels through this period. There is a chance for an S1/Minor Storm or greater event, should any proton-rich flares occur, primarily from the large, complex sunspot group near the west limb before it rotates onto the far side.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	10	10	40	50
Strong	G3	No	1	1	5	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	75	75	50	20
Very Active	R3 to R5 X	No	20	20	10	1

Solar Radiation Storms - (High Energy Protons):

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Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	20	20	10	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm ⁻² sr ⁻¹ s ⁻¹)						